

CLAIMS

1. An apparatus for generating computer models of individuals for generating graphical representations of individuals in different poses comprising:

5 storage means for storing a computer model of a generic person;

means for generating representations of a computer model of a person in poses in accordance with pose instructions;

10 data input means for obtaining data of an individual, representative of the external appearance of said individual in a pose;

determination means for determining the pose adopted by an individual in the data obtained by said data input means;

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comparison means for comparing said obtained data and data generated by said means for generating representation of said model of a person in said pose determined by said determination means, and

20 model generation means for generating a computer model of said individual for generating computer graphical representations of said individual in different poses, wherein said model generation means is arranged to generate said model in accordance with said comparison by

25 said comparison means.

2. Apparatus in accordance with claim 1 wherein said data input means comprises laser stripe scanning apparatus to identify a plurality of points on the surface of an individual in said pose.

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3. Apparatus in accordance with claim 1, wherein said data input means comprises means for obtaining data representative of an outline of said individual in said pose.

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4. Apparatus in accordance with claim 1, wherein said data input means comprises at least one camera for obtaining image data of an individual in said pose.

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5. Apparatus in accordance with claim 4, wherein said at least one camera comprises a digital camera.

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6. Apparatus in accordance with claim 4, wherein said data input means further comprises means for processing image data of an individual in a pose to obtain an outline of said individual in said pose.

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7. Apparatus in accordance with claim 6, wherein said means for obtaining outline data comprises means providing a predefined background wherein said data input

means is arranged to obtain an image of an individual in said pose against said predefined background wherein said means for processing said image data is arranged to identify portions of said image data corresponding to said background and processing said image data to identify the outline of an individual in said image.

8. Apparatus in accordance with claim 7, wherein said processing means is arranged to process said image data to identify portions of said image data corresponding to background by performing a thresholding operation.

9. Apparatus in accordance with claim 8, wherein said means providing a predefined background comprises an illuminated background wherein said processing means is arranged to perform a thresholding operation on the basis of the luminance of portions of an image of an individual in a pose.

10. Apparatus in accordance with claim 9, wherein said means providing a predefined background comprises a light box comprising a floor, back wall and roof, said floor, back wall and roof comprising a translucent material, and means for illuminating said floor, back wall and roof from beneath, behind and above respectively.

11. Apparatus in accordance with claim 8, wherein said background comprises a background of uniform pattern or colour wherein said thresholding operation is arranged to identify within said images of said person in said pose, portions of said image corresponding to said pattern or colour.

12. Apparatus in accordance with claim 1, wherein said determination means comprises at least two foot marks for indicating where an individual should place their feet when adopting said pose.

13. Apparatus in accordance with claim 1, wherein said determination means comprises indicator means for indicating a position at which a user should look at when adopting said pose.

14. Apparatus in accordance with claim 1, wherein said determination means comprise means for instructing a user to adopt a predefined pose.

15. Apparatus in accordance with claim 14, wherein said instruction means comprise display means for displaying an illustration of said pose to be adopted by said individual.

16. Apparatus in accordance with claim 14, wherein said instructions means comprise speakers for broadcasting oral instructions to an individual to adopt a specific pose.

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17. Apparatus in accordance with claim 1, wherein said determination means further comprises means for calculating the pose adopted by an individual from said data representative of the external appearance of said individual in a pose.

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18. Apparatus in accordance with claim 17, wherein said pose calculation means is arranged to identify a plurality of points on the surface of an individual wherein said pose adopted by an individual is determined from the relative orientation of said identified points.

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19. Apparatus in accordance with claim 18, wherein said plurality of points identified from said data comprise any of the top of the user's head either side of a user's neck the tips of the user's hands, the tips of the user's feet, the user's armpits and the user's crotch.

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20. Apparatus in accordance with claim 1, wherein said determination means for determining the pose adopted by

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an individual comprises input means for inputting data indicative of the stance of said individual in said pose.

21. Apparatus in accordance with claim 1, wherein said
5 comparison means comprises scale identification means wherein said scale identification means is arranged to determine from said data obtained by said scanning means scale data indicative of the height of said individual in said pose wherein said comparison means is arranged to
10 compare said obtained data and data generated by said means for generating representation of said model of a person scaled in accordance with said scale data.

22. Apparatus in accordance with claim 1, wherein said
15 comparison means is arranged to compare data representative of points on the surface of said model of a person in said pose determined by said determination means and data representative of points on the surface of said individual in said pose obtained by said data input
20 means.

23. Apparatus in accordance with claim 1, wherein said comparison means further comprises feature identification means for identifying from said data obtained by said
25 data input means portions of said data corresponding to

body parts of an individual wherein said comparison means is arranged to compare the relative positions of said body parts of an individual relative to the representations of said body parts in said model of said person in said pose.

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24. Apparatus in accordance with claim 23, wherein said body parts comprise any of the eyes, nose, ears or mouth of an individual.

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25. Apparatus in accordance with claim 23, wherein said feature detection means is arranged to determine the position of body parts based upon a determination of the luminance or rate of change of luminance of portions of images of said individual in said pose.

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26. Apparatus in accordance with claim 1, wherein said storage means for storing a computer model of a generic person is arranged to store geometry data representative of the relative positioning of a predefined number of points on the surface of a computer wire mesh model of a generic person and data defining a wire mesh topology comprising data representative of the connection of said predetermined number of points on surface of said generic model of a person connected to others of said

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predetermined number of points wherein said means for generating representation is arranged to generate a calculated geometry data for said model of said person in a pose in accordance with animation instructions on the basis of said stored geometry data.

27. Apparatus in accordance with claim 26, wherein said comparison means is arranged to calculate the relative position of points on the surface of an individual identified by obtained data relative to corresponding points on the surface of a computer representation of a generic person in said pose determined by said determination means, wherein said model generation means is arranged to generate a computer model of an individual comprising geometry data representative of the surface of said individual in a predetermined stance, comprising the relative positioning of a predetermined number of points on the surface of a model of said individual in said predetermined stance being points representative of a wire mesh model of said individual connected to other points on the surface of said model in accordance with said topology data stored in said storage means defining topology data for said computer model of a generic person.

28. Apparatus in accordance with claim 26, wherein said model generation means for generating a computer model is arranged to generate geometry data for points on the surface of said individual identified by said feature identification means corresponding to points identifying said features in said geometry data of said model of a generic person stored in said storage means.

29. Apparatus in accordance with claim 27, wherein said model generation means is arranged to generate geometry data comprising points representative of a predefined number of points on the surface of a model of an individual in a predetermined stance based upon a comparison between points identified by said scanning means and said determination means corresponding to points on the surface of a model of a generic person and interpolation of points on the surface of said model of said individual which are not identified as corresponding to points identified by said scanning means and said determination means.

30. Apparatus in accordance with claim 4, wherein said model generation means is arranged to generate a texture rendering function for texture rendering polygons of a wire mesh computer model of an individual in a

predetermined stance by processing image data obtained by said at least one camera of an individual in said pose and comparing said image data with a representation of said computer model of said individual in said pose.

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31. Apparatus in accordance claim 1 wherein said data input means is arranged to obtain data of an individual representative of the external appearance of said individual in a plurality of poses, said apparatus further comprising means for processing said data to calculate composite data representative of said individual in a single pose.

32. Apparatus in accordance with claim 31 wherein said scan data processing means is arranged to generate said composite data on the basis of said determination by said determination means of the pose adopted by an individual wherein said processing means is arranged to adjust said data for an individual so that data obtained by a plurality of poses corresponds to data representative of a single pose.

33. Apparatus in accordance with claim 32, wherein said scan data processing means is arranged to adjust scan data identified by said determination means as

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corresponding to the same points on the surface of an individual in data representative of said individual in different poses so that said points of said individual in said different poses correspond to the same points on the surface of a model of said individual.

34. Apparatus in accordance with claim 33, wherein said data processing means is arranged to adjust data representative of an individual in a pose to remove data representative of parts of the surface of an individual in a pose which corresponds to parts of the surface of an individually which is represented in another set of data obtained of said individual in another pose.

35. Apparatus for generating computer animations of an individual representative of the movement of said individual comprising:

apparatus for generating computer models of individuals in accordance with claim 1, means for storing data representative of a sequence of animation instructions and means for displaying representations of said generated computer model of an individual in poses in accordance with said animation instructions using said generated model.

36. Apparatus in accordance with claim 1, further comprising:

means for inputting model identification data; and

means for transmitting said model of said individual

5 and said model identification data to a server.

37. Apparatus in accordance with claim 36, further comprising a printer for printing a hard copy information carrier having recorded thereon identification data for
10 identifying a computer model transmitted to a server.

38. Apparatus in accordance with claim 1, further comprising recording means for recording on an information carrier data representative of said computer
15 model generated by said model generation means.

39. A method for generating computer models of individuals for generating graphical representations of individuals in different poses comprising the steps of:

20 storing a computer model of a generic person in a predefined pose;

scanning an individual to obtain data representative of the external appearance of an individual in a pose;

determining the pose adopted by an individual
25 scanned in said scanning step;

generating a computer representation of said generic person in said pose determined in said determination step;

5 comparing said data representative of the external appearance of an individual in said pose with data generated of said stored generic model of a person in said pose determined in said determination step; and

 generating a computer model of said individual on the basis of said comparison.

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40. A method in accordance with claim 39 wherein said scanning step comprises scanning an individual using laser stripe scanning apparatus to identify a plurality of points on the surface of an individual in said pose.

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41. A method in accordance with claim 39, wherein said scanning step comprises obtaining data representative of an outline of said individual in said pose.

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42. A method in accordance with claim 39, wherein said scanning step comprises obtaining image data using a camera.

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43. A method in accordance with claim 42, wherein said scanning step further comprises means for processing

image data of an individual in a pose to obtain an outline of said individual in said pose.

5 44. A method in accordance with claim 43, wherein said processing step comprises processing said image data to identify portions of said image data corresponding to background by performing a thresholding operation.

10 45. A method in accordance with claim 39, wherein said determination step comprises instructing a user to adopt a predefined pose.

15 46. A method in accordance with claim 45, wherein said instruction comprises displaying an illustration of said pose to be adopted by said individual.

20 47. A method in accordance with claim 45, wherein said instructions comprises broadcasting oral instructions to an individual to adopt a specific pose.

25 48. A method in accordance with claim 39, wherein said determination step further comprises calculating the pose adopted by an individual scanned by said scanning means from said data representative of the external appearance of said individual in a pose.

49. A method in accordance with claim 48, wherein said calculation comprises identifying a plurality of points on the surface of an individual wherein said pose adopted by an individual is determined from the relative orientation of said identified points.

50. A method in accordance with claim 49, wherein said plurality of points identified from said scan data comprise any of the top of the user's head either side of a user's neck the tips of the user's hands, the tips of the user's feet, the user's armpits and the user's crotch.

51. A method in accordance with claim 39, wherein said determination means for determining the pose adopted by an individual scanned by said scanning means comprises input means for inputting data indicative of the stance of said individual in said pose.

52. A method in accordance with claim 39, wherein said comparison step comprises identifying a scale of an image and comprising said scan data and data generated representative of said model of a person scaled in accordance with said scale.

53. A method in accordance with claim 39, wherein said comparison step further comprises the steps of identifying from said data obtained by said scanning means portions of said data corresponding to body parts of an individual; and compare the relative positions of said body parts of an individual relative to the representations of said body parts in said model of said person in said pose.

54. A method in accordance with claim 53, wherein said body parts comprise any of the eyes, nose, ears or mouth of an individual.

55. A method in accordance with claim 53, wherein identification of the position of body parts from image data is based upon a determination of the luminance or rate of change of luminance of portions of images of said individual in said pose.

56. A method in accordance with claim 39, wherein said comparison step comprises calculating the relative position of points on the surface of an individual identified by said scan data and said determination step, relative to corresponding points on the surface of a computer representation of a generic person in said pose

and generating a computer model of an individual comprising geometry data representative of the surface of said individual in a predetermined stance, comprising the relative positioning of a predetermined number of points on the surface of a model of said individual in said predetermined stance being points representative of a wire mesh model of said individual connected to other points on the surface of said model in accordance with a predetermined topology.

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57. A method in accordance with claim 39, further comprising generating a texture rendering function for texture rendering polygons of a wire mesh computer model of an individual in a predetermined stance by processing image data of said individual in at least one pose and comparing said image data with a representation of said computer model of said individual in said at least one pose.

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58. A method in accordance with claim 39 scanning an individual in a plurality of poses wherein said generation of said computer model is based upon data obtained in said plurality of scans.

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59. A method in accordance with claim 39, further

comprising:

means for inputting model identification data; and

means for transmitting said model of said individual
and said model identification data to a server.

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60. A method in accordance with claim 39, further
comprising the step of recording on an information
carrier data representative of said computer model
generated by said model generation means.

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61. A method for generating computer animations of an
individual representative of the movement of said
individual comprising:

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the steps of generating computer models of
individuals in accordance with claim 39, storing data
representative of a sequence of animation instructions
and displaying representations of said generated computer
model of an individual in poses in accordance with said
animation instructions generated by said animation means.

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62. A method for generating computer models of
individuals for generating graphical representations of
individuals in different poses comprising the steps of:

storing a computer model of a generic person;

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inputting data representative of the external

appearance of an individual in a pose;

inputting data indicative of said pose;

generating a computer representation of said generic
person in said pose determined in said determination
5 step;

comparing said input data representative of the
external appearance of said individual with data
generated of said generic person in said pose adopted by
said individual as defined by said input data; and

10 generating a computer model of said individual on
the basis of said comparison.

63. An information carrier having recorded thereon data
for generating a computer model of the external
15 appearance of an individual in a plurality of poses, said
data comprising:

geometry data representative of the relative
positioning of predefined number of points on the surface
of the said individual in a predetermined stance; and

20 data representative of a texture rendering function
for texture rendering polygons of a wire mesh computer
model of said individual in said predetermined stance,
said wire mesh computer model comprising the connection
of said points on the surface of said individual defined
25 by said geometry data connected to other of said points

defined by said geometry data, in accordance with a predefined set of connection data.

64. A computer apparatus having stored therein data for
5 generating computer models of the external appearance of
a plurality of individuals in a plurality of poses,
comprising:

means for storing identification data for a
plurality of computer models of the external appearance
10 of a plurality of individuals in a predefined stance;

means for storing geometry data representative of a
the relative positioning of predefined number of points
on the surface of the each of said plurality of
individuals in said predetermined stance; and

15 means for storing data representative of a plurality
of texture rendering functions for texture rendering
polygons of wire mesh computer models of each of said
plurality of individuals in said predetermined stance,
said wire mesh computer models comprising the connection
20 of said points on the surface of a said individual
defined by said geometry data connected to other of said
points defined by said geometry data,

wherein said computer apparatus is arranged to
associate said identification data for a model of an
25 individual with geometry data and a texture rendering

function for said model.

65. An apparatus in accordance with claim 64, further comprising:

5 means for receiving data,
 means for determining whether said data corresponds
to any of said plurality of identification data, and
 means for transmitting geometry data and texture
rendering functions associated with received data
10 corresponding to identification data.

66. A process of generating a computer model of an
individual for generating computer graphical
representations of an individual in a plurality of poses
15 comprising the steps of:

 providing a computer network comprising:

 a first computer apparatus in accordance with
claim 64; and

 a second computer apparatus;

20 providing an information carrier having recorded
thereon identification data identifying data stored on
said first computer apparatus, for generating a computer
model representative of the external appearance of an
individual in any of a plurality of poses;

25 inputting said identification data from said

information carrier into said second computer apparatus;

transmitting said identification data from said second computer apparatus to said first computer apparatus; and

5 transmitting said data for generating a computer model representative of the external appearance of an individual in any of a plurality of poses, identified by said identification data, from said first computer to said second computer.

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67. A computer apparatus for outputting computer graphical representations of a computer model of an individual in poses in accordance with animation instructions, said apparatus comprising:

15 means defining a wire mesh topology comprising data representative of the connection of a predetermined number of points on the surface of a generic model of a person connected to other of said predetermined number of points on the surface of a generic model of a person;

20 means for receiving geometry data representative of a the relative positioning of said predetermined number of points on the surface of an individual in a predetermined stance;

25 means for receiving data representative of a texture rendering function for texture rendering polygons

of a wire mesh computer model of said individual in said predetermined stance, said wire mesh computer model comprising the connection of said points on the surface of said individual defined by geometry data connected to other of said points defined by said geometry data in accordance with said defined wire mesh topology; and

means for outputting computer graphical representations of said individual in a stances accordance with animation instructions, comprising:

means for calculating a transformation function between received geometry data representative of a the relative positioning of said predefined number of points on the surface of said model of said individual in said predetermined stance, into geometry data representative of corresponding points on the surface of said model of an individual in a stance defined by animation instructions;

means for calculating a texture rendering function for said model of said individual in said stance defined by animation instructions based upon said calculated transformation and received data representative texture rendering function for texturing a wire mesh model of said individual in said predetermined stance; and

output means for outputting a computer graphical

representation of said model of said individual on the basis of said calculated texture rendering function and said received geometry data transformed in accordance with said calculated transformation.

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68. A computer apparatus in accordance with claim 67, further comprising means for inputting data and means for transmitting data to request the transmission of geometry data and data representative of a texture rendering function.

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69. An apparatus for generating computer models of individuals in accordance with claim 1, further comprising weighing means for obtaining weight data of an individual; wherein said generation means is arranged to generate a computer model of said individual on the basis of a comparison of the volume of a model of a generic person scaled so as to occupy a volume corresponding to the expected volume of a model of an individual having said weight.

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70. Apparatus in accordance with claim 69, wherein said model generation means is arranged to combine portions of a model generated on the basis of comparison of data representative of the external appearance of an

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individual and data generated of said model of a person
in said pose determined by said determination means, and
a model of a generic person scaled to have a
representative volume representative of the volume of a
5 model of an individual having the weight of said
individual from whom weight data has been obtained.

71. Apparatus in accordance with claim 70, wherein said
model generation means is arranged to generate a texture
10 rendering function for rendering the colour on a model of
an individual wherein said texture rendering function is
generated on the basis of a stored texture rendering
function for a generic individual and image data obtained
for an image of an individual's face.

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72. Apparatus for generating computer models of people,
comprising:

at least one booth adapted for receiving a person;
means for obtaining an image of a person in the
20 booth;

means for creating a three-dimensional computer
model from said image;

payment means associated with said booth; and

means for making said three-dimensional computer
25 model available in a predetermined way upon a payment

being made utilising said payment means.

73. Apparatus for generating computer models of people, comprising:

5 means for obtaining an image of a person and creating a three-dimensional computer model from said image;

 payment means associated with said obtaining means; and

10 means for making said three-dimensional computer model available in a predetermined way upon a payment being made utilising said payment means.

74. Apparatus for generating computer models of people, comprising:

15 means for obtaining an image of a person and creating a three-dimensional animated computer model from said image;

 payment means associated with said obtaining means; and

20 means for making said three-dimensional animated computer model available in a predetermined way upon a payment being made utilising said payment means.

25 75. A booth for recording image data for generating

computer models of people comprising:

wall means defining a zone for receiving an individual;

lighting apparatus arranged illuminate the surface
5 of an individual with said zone;

image recording apparatus arranged to obtain image data representative of the external appearance of an individual; and

an audio visual instruction display for instructing
10 an individual to adopt one or more specific poses within said booth.

76. Apparatus for generating computer models of people comprising:

15 a booth incorporating apparatus for recording an image of the external appearance of an individual;

a dispenser for dispensing a carrier having a password recorded thereon; and

means for storing a computer model generated on the
20 basis of said image data, wherein said storage means is arranged to output said model on the basis on receipt of data representative of said password.

77. An apparatus for generating images of individuals
25 comprising:

a booth for receiving an individual;

apparatus for recording image data of external appearance of an individual in a first number of poses within said booth; and

5 means for deriving from said image data representative of said individual in any of a second number of poses, said second number being greater than said first number.

10 78. An apparatus in accordance with claim 77, further comprising means for generating an animation sequence representative of the motion of an individual, said animation sequence comprising a sequence of contiguous images of said individual in a plurality of poses.

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79. A system for generating animated computer models of individuals comprising:

at least one booth for recording image data of individuals;

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means for generating from said image data computer models of said individuals; and

a plurality of terminals having stored therein animation means arranged to receive said computer models wherein said animation means are arranged to generate
25 animation sequences of images of said individuals in any

of a plurality of poses using said generated computer models.

80. An apparatus for obtaining image data for generating
5 computer models of individuals comprising:

a booth for receiving an individual;

image recording apparatus for obtaining image data
representative of the external appearance of an
individual within said booth;

10 lighting means for lighting an individual within
said booth; and

indicators for indicating to an individual a pose to
adopt whilst being illuminated by said lighting means.

15 81. A booth for generating computer models of people
comprising:

image recording apparatus for recording image data
representative of the external appearance of an
individual standing within said booth;

20 first and second lighting means for illuminating an
individual standing in said booth, wherein said first
lighting means is arranged to illuminate the interior of
said booth from a first direction and said second
lighting means is arranged to illuminate said interior of
25 said booth from a direction different to said first

direction wherein said image recording apparatus is arranged to obtain image data of an individual within said booth both with and without said second lighting means being activated.

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82. A booth for generating computer models of people comprising:

image recording means for obtaining image data representative of the external appearance of an individual; and

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a light box for illuminating an individual in a pose, said light box comprising a curved wall remote from said recording means, and illumination means for illuminating said curved wall.

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83. A booth for generating computer models of people comprising:

image recording apparatus for obtaining image data representative of the external appearance of an individual;

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pose markers for indicating to an individual a pose to adopt when image data is obtained of said individual by said recording apparatus; and

model generation means, said model generation means having installed therein a generic model of a person;

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data relating to said pose markers; and

processing means for generating a computer model of
an individual based upon said generic model, said data
relating to pose markers and image data of an individual
5 obtained by said image recording apparatus.

84. An apparatus for generating data for generating
computer models of individuals comprising:

a booth for receiving an individual;

10 means for obtaining image data representative of the
external appearance of an individual within said booth;
and

means for editing said image data to generate data
suitable for use for creating a model of said individual.

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85. A method of generating a computer model of an
individual comprising:

obtaining image data of an individual lit from
behind;

20 obtaining an image of an individual lit from in
front and behind; and

processing said obtained image data together with a
computer model of a generic individual to obtain a
computer model of said individual.

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86. Apparatus for generating a computer model of an individual comprising:

storage means for storing a computer model of an individual;

5 image capture means for obtaining image data of an individual lit from behind;

image capture means for obtaining image data of an individual lit from in front and behind; and

10 processing means for processing obtained image data together with said computer model to obtain a computer model of said individual.

87. A method of generating a computer model of an individual comprising the steps of:

15 paying for the generation of said model;
capturing image data representative of an individual;

dispensing a password;

20 generating a model of said individual on the basis of said image data; and

transferring data representative of said computer model to a computer apparatus on the basis of receipt of said password.

25 88. An apparatus for generating computer models of

people comprising:

audio visual instruction means for instructing an individual to adopt a plurality of predefined poses;

5 image capture apparatus for capture image data representative of the external appearance of an individual in a pose;

activation means for activating said image capture apparatus to capture images of individuals after they have been instructed to adopt a predefined pose by said audio visual instruction means; and

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computer model generation means for generating a computer model of said individual on the basis of said captured image data.

15 89. A process of generating a computer model of an individual comprising:

instructing an individual to adopt a plurality of predefined poses;

capturing image data of said individual; after they have been instructed to adopt each of said plurality of poses;

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dispensing a password;

generating a computer model of said individual on the basis of said image data of said individual in said plurality of poses and transferring data representative

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of said computer model to a computer apparatus on the receipt of said password.

90. Apparatus for generating computer models of individuals, said apparatus comprising:

a booth for receiving an individual;

lighting means for illuminating an individual within said booth in different illumination conditions; and

image capture apparatus for capturing image data representative of the appearance of an individual, said image capture apparatus arranged to obtain image data representative of an individual within said booth and activation means for activating said image capture apparatus to obtain image data of an individual within said booth under said different illumination conditions; and

means for generating a computer model of an individual on the basis of said image data.

91. A method of generating a computer model of an individual comprising the steps of:

lighting an individual from behind;

activating a flash and camera to obtain image data of said individual illuminated from in front and behind;

obtaining image data representative of an individual

illuminated only from behind; and

processing said image data to generate a computer model of said individual.

5 92. An apparatus for generating computer models of individuals said apparatus comprising:

 a booth for receiving an individual;

 apparatus for obtaining image data of an individual within said booth in four orthogonal poses;

10 means for obtaining outlines of individuals from said image data;

 means for processing said outlines and a stored generic model of an individual to generate a computer model of said individual; and

15 means for texture rendering said generated computer model using said image data.

 93. A booth in accordance with claim 92, further comprising means for identifying portions of an outline
20 indicative of points on the surface of an individual which are not contiguous with each other; and

 processing means for processing an outline to replace portions of an outline corresponding to non-contiguous portions of the surface of an individual with
25 an estimate of an outline corresponding to contiguous

points on the surface of an individual.

94. An apparatus for generating computer models of individuals comprising:

5 a touch screen, said touch screen being arranged to display portions of images of individuals, and indicator marks for indicating points on said images corresponding to facial features of said individual;

 means for adjusting the position of said indicators
10 on said display; and

 means for generating a computer model of an individual on the basis of the relative positions of said indicators relative to said image.

15 95. Apparatus for generating computer models of individuals comprising:

 means for obtaining image data representative of an individual seated in a wheelchair; and

 means for generating a computer model of an
20 individual seated in a wheelchair on the basis of said image data.

96. Apparatus for generating texture rendered computer model of individuals comprising:

25 means for storing a computer model of a generic

individual;

means for obtaining outline data from images of an individuals in a pose lit from behind;

5 means for obtaining image data of an individual lit from in front;

means for processing said outline data and said computer model to generate a computer model of said individual;

10 means for texture rendering said computer model using said image data to generate a texture rendered computer model of said individual.

15 97. A method of generating computer models of individuals in the absence of clothing comprising the steps of:

storing a computer model of the shape and appearance of a generic person;

20 obtaining image data of an individual wearing clothing, wherein at least some of the surface of said said individual is not covered by clothing; and

25 generating a computer model of said individual utilising said image data of portions of said individual not covered by clothing to generate a model of said portion of said body and said stored computer model to generate a model of the portions of said individual

covered by clothing.

98. A method in accordance with claim 97 wherein the generated model of the appearance of the portions of said individual covered by clothing are determined by said stored model of the appearance of the corresponding portions of a generic person and a determined skin tone colour, determined utilising said image data of said portions of said individual not covered by clothing.

99. A method in accordance with claim 98 wherein said image data of portions of said individual not covered by clothing comprise at least image data of either the face or hands of said individual.

100. A method in accordance with claim 97, wherein said storage step comprises; storing computer models corresponding to a plurality of body types, wherein said method further comprises the steps of:

selecting a body type to generate a computer model of an individual; and

utilising said computer model corresponding to said selected body type to generate a model of the portions of said individual covered by clothing.

101. A method in accordance with claim 100 wherein said body types comprise computer models of individuals of different sexes, ages or heights.

5 102. A method in accordance with claim 97, further comprising the steps of storing variation data identifying the manner in which the shape of an individual varies in dependence upon weight of an individual;

10 obtaining weight data indicative of the weight of an individual of whom a model is to be generated;

 wherein the generation of a computer model comprises utilising a computer model of a generic person modified in accordance with said variation data and said weight
15 data to generate a model of the portions of said individuals covered by clothing.

 103. A method of generating data indicative of the manner in which an item of clothing alters the appearance of an
20 individual comprising the steps of:

 storing a computer model of a mannequin in the absence of clothing:

 obtaining image data of said mannequin wearing an item of clothing

25 generating a computer model of said mannequin

wearing said item of clothing utilising said image data;
and

generating data indicative of the manner in which an
item of clothing alters the appearance of an individual
5 on the basis of a determination of the differences
between said stored model and said generated model.

104. A method in accordance with claim 103 wherein said
obtaining step comprises steps of:

10 generating an image of an item of clothing; and
combining said generated image of an item of
clothing with a generated image of a said mannequin.

105. A method in accordance with claim 103, further
15 comprising the steps of:

providing a mannequin;
dressing said mannequin with said item of clothing;
and

obtaining image data of said mannequin wearing said
20 item of clothing, wherein said stored model comprises a
stored model of said provided mannequin.

106. A method in accordance with claim 103, further
comprising the steps of:

25 providing a plurality of mannequins

storing computer models of said plurality of mannequins;

selecting a mannequin; and

5 dressing said selected mannequin with said item of clothing and obtaining image data, wherein said generation of data comprises the determination of the differences between a computer model generated from said image data and the stored computer model for said selected mannequin.

10

107. A method in accordance with claim 106, wherein a plurality of mannequins are provided having different surface colours wherein said selection step comprises selecting a mannequin of a contrasting colour to said item of clothing.

15

108. A method in accordance with claim 106 wherein a plurality of mannequins are provided having different shapes, wherein said selection step comprises selecting a mannequin of an appropriate shape for wearing said item of clothing.

20

109. A method in accordance with claim 108 wherein said plurality of mannequins are provided comprising mannequins having male and female anatomical shapes.

25

110. A method in accordance with claim 103 wherein said generated data comprises shape data indicative of the manner in which an item of clothing alters the shape of an individual, and a texture rendering function for texture rendering the surface of a computer model of an individual modified utilising said shape data.

111. A method in accordance with claim 110 wherein said texture rendering function comprises data indicative of a colour texture map.

112. A method in accordance with claim 110 wherein said texture rendering function comprises data indicative of a black and white texture map and colour data indicative of one or more colours in which an item of clothing is available.

113. A method in accordance with claim 103 further comprising the step of recording said generated data on a storage medium.

114. A method of generating a computer model of an individual wearing a selected item of clothing comprising the steps of:

obtaining a computer model of an individual in the absence of clothing;

5 obtaining data indicative of the manner in which each of a plurality of items of clothing alter the appearance of an individual;

selecting an item of clothing from said plurality of items of clothing; and

10 generating a computer model of said individual wearing said selected item of clothing utilising said computer model and said obtained data for said selected item of clothing.

115. A method in accordance with claim 114 wherein said
15 obtaining a computer model comprises the step of:

generating a computer model in accordance with claim 97.

116. A method in accordance with claim 114 wherein said
20 obtaining data comprises the step of:

generating data in accordance with claim 103.

117. A method in accordance with claim 114, wherein
said model of an individual comprises data
25 indicative of the shape and appearance of an individual,

wherein said generation step comprises the steps of:

generating a model of the shape said individual wearing a selected item of clothing by utilising said data indicative of the shape of said individual and data indicative of the manner in which said selected item of clothing alters the shape of an individual; and

generating a model of the appearance of the surface of said individual wearing said selected item of clothing utilising said data indicative of the appearance of said individual and data indicative of the appearance of surface of said selected item of clothing.

118. A method in accordance with claim 117 wherein said generated model comprises a computer model of said individual wearing a selected plurality of items of clothing, wherein each of said selected items of clothing is associated with data indicative of the relative position of said items of clothing to each other and the skin of an individual wearing a said item of clothing, and said generating step comprises the steps of:

generating data indicative of the appearance of said individual utilising, for portions of said model corresponding to unclothed portions model of said individual in the absence of clothing; and for the remaining portions said data modified by data for the

manner in which said appearance is altered by the outermost item of clothing worn at said remaining portions of said model.

5 119. A method in accordance with claim 118 wherein said generation step comprises steps of: for each of said plurality of items of clothing:

 determining which item of clothing of said selected items of clothing is worn next closest to the skin;

10 generating a model of an individual wearing said determined item of clothing by modifying a model of said individual wearing items of clothing beneath said item of clothing; and

 utilising said generated model of said individual
15 wearing said determined item of clothing to generate a model of said individual wearing said next outermost item of clothing.

 120. A method of obtaining order data for items of
20 clothing comprising steps of:

 receiving selection data identifying an item of clothing;

 generating model of an individual wearing a selected item of clothing identified by said selection data in
25 accordance with claim 114; and

displaying image data generated utilising said generated model as part of a user input interface for inputting order data for ordering said item of clothing identified by said selection data.

5

121. A method of obtaining order data in accordance with claim 120 further comprising the step of:

receiving colour selection data wherein said generation of a model of an individual comprises generating a model of an individual wearing an item of clothing corresponding to said colour selection data, wherein said user input interface is adapted for inputting order data for ordering said item of clothing in said colour corresponding to said colour selection data.

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122. Apparatus for generating computer models of individuals in the absence of clothing comprising:

storage means for storing a computer model of the shape and appearance of a generic person;

20

image input means for obtaining image data of an individual wearing clothing, wherein at least some of the surface of said individual is not covered by clothing; and

25

model generation means for generating a computer

model of said individual utilising said image data of portions of said individual not covered by clothing to generate a model of said portions of said body and said stored computer model stored in said storage means to
5 generate a model of the portions of said individual covered by clothing.

123. An apparatus in accordance with claim 122 wherein said model generation means is arranged to determine the
10 appearance of the portions of said individual covered by clothing, utilising said stored model of the appearance of the corresponding portions of a generic person and a determined skin tone colour, determined utilising said image data of said portions of said individual not
15 covered by clothing.

124. Apparatus in accordance with claim 122, wherein said storage means is arranged to store computer models corresponding to a plurality of body types, said
20 apparatus further comprising:

selection means for selecting a body type to generate a computer model of an individual, wherein said model generation means is arranged to utilise said computer model corresponding to said selected body type
25 to generate a model of the portions of said individual

covered by clothing.

125. An apparatus in accordance with claim 124 wherein
said body types comprise computer models of individuals
5 of different sexes, ages or heights.

126. An apparatus in accordance with claim 122 further
comprising:

weighing means for obtaining weight data indicative
10 of the weight of an individual of whom a model is to be
generated;

wherein said storage means is arranged to store
variation data identifying the manner in which the shape
of an individual varies in dependence upon weight of an
15 individual; and said model generation means is arranged
to generate a model of an individual utilising a computer
model of a generic person modified in accordance with
said variation data and said weight data obtained for
said individual to generate a model of the portions of
20 said individual covered by clothing.

127. Apparatus for generating data indicative of the
manner in which an item of clothing alters the appearance
of an individual comprising:

25 means for storing a computer model of a mannequin in

the absence of clothing:

means for obtaining image data of said mannequin wearing an item of clothing:

5 means for generating a computer model of said mannequin wearing said item of clothing utilising said image data; and

10 means for generating data indicative of the manner in which an item of clothing alters the appearance of an individual on the basis of a determination of the differences between said stored model and said generated model.

128. Apparatus in accordance with claim 127 wherein said means for obtaining image data comprises

15 means for generating an image of an item of clothing; and

means for combining said generated image of an item of clothing with a generated image of a said mannequin.

20 129. Apparatus in accordance with claim 127 further comprising: a mannequin; and

25 said item of clothing for which data is to be generated, wherein said means for obtaining image data of said mannequin wearing said item of clothing comprises a camera.

130. Apparatus in accordance with claim 129, wherein said means for obtaining image data comprises a means for providing a predefined background against which said image data of mannequin may be obtained.

5

131. Apparatus in accordance with claim 130, further comprising a turntable, wherein said mannequin is adapted to be fixed to said turntable, and wherein when said mannequin is fixed to said turntable, said turntable is arranged to present different views of said mannequin in front of said background to said camera, when said turntable is turned.

10

132. Apparatus in accordance with claim 129, further comprising:

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a plurality of mannequins; and

selection input means for inputting data identifying a selected one of said mannequins;

wherein said means for storing has stored therein computer models of said plurality of mannequins; and said means for said generation a computer model is arranged to determine the differences between a computer model generated from said image data and the stored computer model corresponding to data input identifying a selected mannequin.

20

25

133. Apparatus in accordance with claim 132, wherein a plurality of mannequins comprise mannequins having different surface colours.

5 134. Apparatus in accordance with claim 132 wherein said plurality of mannequins comprise mannequins having different shapes.

10 135. Apparatus in accordance with claim 134 wherein said plurality of mannequins comprises mannequins having male and female anatomical shapes.

15 136. Apparatus in accordance with claim 127 wherein said means for generating a computer model is arranged to output model data comprising shape data indicative of the manner in which an item of clothing alters the shape of an individual, and a texture rendering function for texture rendering the surface of a computer model of an individual modified utilising said shape data.

20

137. Apparatus in accordance with claim 136 wherein said texture rendering function comprises data indicative of a colour texture map.

138. Apparatus in accordance with claim 137 wherein said texture rendering function comprises data indicative of a black and white texture map and colour data indicative of one or more colours in which an item of clothing is available.

139. Apparatus in accordance with claim 127 further comprising means for recording data indicative of said generated model on a storage medium.

140. Apparatus for generating a computer model of an individual wearing a selected item of clothing comprising:

first receiving means for obtaining a computer model of an individual in the absence of clothing;

second receiving means for obtaining data indicative of the manner in which each of a plurality of items of clothing alter the appearance of an individual;

clothing selection means for selecting an item of clothing from said plurality of items of clothing; and

clothing model generation means generating a computer model of said individual wearing said selected item of clothing utilising said computer model and said obtained data for said selected item of clothing.

141. Apparatus in accordance with claim 140 wherein said first receiving means comprises apparatus in accordance with claim 122.

5 142. Apparatus in accordance with claim 140 wherein said second receiving means comprises apparatus in accordance with claim 127.

10 143. Apparatus in accordance with claim 140 wherein said model of an individual comprises data indicative of the shape and appearance of an individual, wherein said clothing model generation means comprises:

15 means for generating a model of the shape said individual wearing a selected item of clothing by utilising said data indicative of the shape of said individual and data indicative of the manner in which said selected item of clothing alters the shape of an individual; and

20 means for generating a model of the appearance of the surface of said individual wearing said selected item of clothing utilising said data indicative of the appearance of said individual and data indicative of the appearance of surface of said selected items of clothing.

25 144. Apparatus in accordance with claim 143, wherein

said generated model generated by said clothing model generation means comprises a computer model of an individual wearing a selected plurality of items of clothing, further comprising association means associating said selected items of clothing with data indicative of the relative position of said item of clothing to each other and the skin of an individual wearing a said item of clothing, and wherein said clothing model generation means is arranged to generated data indicative of the appearance of said individual utilising, for portions of said model corresponding to unclothed portions model of said individual in the absence of clothing; and for the remaining portions said data modified by data for the manner in which said appearance is altered by the outermost item of clothing worn at said remaining portions of said model.

145. Apparatus in accordance with claim 144 wherein said clothed model generation means is arranged for each of said plurality of items of clothing to:

determine which item of clothing of said selected items of clothing is worn next closest to the skin;

generate a model of an individual wearing said determined item of clothing by modifying a model of said individual wearing items of clothing beneath said item of

clothing; and

utilising said generated model of said individual wearing said determined item of clothing to generate model of said individual wearing said next outermost item of clothing.

146. Apparatus for obtaining order data for items of clothing comprising:

means for receiving selection data identifying an item of clothing;

means for generating model of an individual wearing a selected item of clothing identified by said selection data in accordance with claim 140; and

display means displaying image data generated utilising said generated model as part of a user input interface for enabling the input order data for ordering said item of clothing identified by said selection data.

147. Apparatus for obtaining order data in accordance with claim 146 further comprising:

means for receiving colour selection data wherein said generation of a model of an individual comprises generating a model of an individual wearing an item of clothing corresponding to said colour selection data, wherein said user input interface is adapted for

inputting order data for ordering said item of clothing in said colour corresponding to said colour selection data.

5 148. A storage medium having recorded thereon data identifying the manner in which items of clothing alter the appearance of an individual generated in accordance with the method of claim 103.

10 149. Computer apparatus for outputting data identifying the manner in which items of clothing alter the appearance of an individual comprising:

15 storage means for storing data indicative of the manner in which items of clothing alter the appearance of a generic individual;

 association means for associating with each of said items of clothing for which data is stored within said storage means with identification data;

20 receiving means for receiving identification data; and

 output means for outputting data associated with identification data received by said receiving means.

25 150. Computer apparatus in accordance with claim 149 wherein said storage means is arranged to store data

comprising:

shape data indicative of the manner in which an item of clothing alters the shape of an individual; and

5 a texture rendering function for texture rendering the surface of a computer model of an individual modified utilising said shape data.

151. Computer apparatus in accordance with claim 149 wherein said texture rendering function comprises data
10 indicative of a colour texture map.

152. Computer apparatus in accordance with claims 149 wherein said texture rendering function comprises data indicative of a black and white texture map and colour
15 data indicative of one or more colours in which an item of clothing is available.

153. Apparatus in accordance with claim 7, wherein said means providing a predefined background comprises a
20 curtain.

154. Apparatus in accordance with claim 153, wherein said means providing a predefined background further comprises means for placing said curtain in tension.
25

155. Apparatus in accordance with claim 154, wherein said means for placing said curtain in tension comprises a housing from which extends a curtain rail to which the top of the curtain is attached; and

5 a floor extending from said housing, wherein the bottom of said curtain is attached to said floor.

156. Apparatus in accordance with claim 155 wherein said at least one camera is mounted on said housing, said
10 housing further comprising highly means for illuminating said predefined background.

157. Apparatus in accordance with claim 4 further comprising:

15 means for projecting structured light on at least part of an individual in a pose; wherein said model generation means is arranged to utilise image data of an individual onto which structured light is projected to generate a computer model of at least part of the
20 individual onto which structured light is projected.

158. A method of selling items of clothing comprising steps of:

 designing an item of clothing;

25 generating data identifying how said designed item

of clothing alters the shape and appearance of an individual wearing said item of clothing; and

displaying a representation of an individual wearing said item of clothing utilising said generated data.

5

159. A method of generating data for representing an individual in a computer game comprising the steps of:

generating a computer model of an individual in accordance with claim 39;

10

generating image data of said individual in a plurality of predefined poses, wherein said poses comprise poses utilised within a computer game; and

generating data for representing said individual in said computer game utilising said generated image data.